96M11680

96M11680-1

Digital Photoelectric Sensor

PS-N10 Series

Instruction Manual

Read this instruction manual before using the product in order to achieve maximum performance. Follow instruction or you may be exposed to hazards.

Keep this instruction manual in a safe place after reading it so that it can be used at any time.

DANGER	**It indicates a hazardous situation which, if not avoided, will result in death or serious injury.**
WARNING	**It indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
CAUTION	**It indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.**
NOTICE	**It indicates a situation which, if not avoided, could result in product damage as well as property damage.**

Important	**It indicates cautions and limitations that must be followed during operation.**
Point	**It indicates additional information on proper operation.**
Reference	It indicates tips for better understanding or useful information.

See "PS-N10 Series User's Manual" for details on the features of the PS-N10 series and detailed instructions for configuration.

Safety Information for PS-N10 Series.

WARNING	• **This product is only intended to detect object(s). Do not use this product for the purpose of protecting a human body or a part of the human body.** • **This product is not intended for use as an explosion-proof product. Do not use this product in a hazardous location and/or potentially explosive atmosphere.** • **This product uses DC power. Do not apply AC power. The product may explode or burn if an AC voltage is applied.**

NOTICE	• **Do not wire the amplifier line along with power lines or high-tension lines, as the sensor may malfunction or be damaged due to noise.** • **When using a commercially available switching regulator, ground the frame ground terminal and ground terminal.** • **Do not use the PS-N10 series outdoors, or in a place where extraneous light can enter the light-receiving element directly.** • **Due to individual dispersion characteristics and the difference in sensor head models, the maximum sensing distance or displayed value may not be the same on all units.**

Precautions on Regulations and Standards

■ CSA Certificate

PS-N10 series complies with the following CSA and UL standards and has been certified by CSA (Class 2252 05 / Class 2252 85). (CSA mark is attached only to the sensor amplifier certified by CSA.)

- Applicable standard: CAN/CSA C22.2 No.61010-1
  UL61010-1
  Pollution Degree: 3
  Overvoltage Category: I
- Use the following power supply.
  CSA/UL certified power supply that provides Class 2 output as defined in the CEC (Canadian Electrical Code) and NEC (National Electrical Code), or CSA/UL certified power supply that has been evaluated as a Limited Power Source as defined in CAN/ CSA-C22.2 No. 60950-1/ UL60950-1
- Use this product at the altitude of 2000 m or less.
- Indoor use only.
- The sensor head cable and the sensor head connection cable must be installed with avoiding mechanical damage (e.g.: crushing).
- The power/input-output cable for amplifier unit is for internal wiring only. The amplifier must be installed inside of an approved enclosure or install power/input-output cable for amplifier with approved protection.
- The following cables are rated 30 V.
  - sensor head cable
  - sensor head connection cable
  - power/input-output cable for amplifier unit
  Install these cables where it is separated from the circuit over 30 V.

■ CE Marking

Keyence Corporation has confirmed that this product complies with the essential requirements of the applicable EC Directive, based on the following specifications.
Be sure to consider the following specifications when using this product in a member state of the European Union.

● EMC Directive (2004/108/EC)

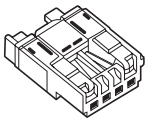
- Applicable standard EMI : 60947-5-2, Class A
  EMS : 60947-5-2
- When connecting with the NU-CL1, always install in a conductive enclosure (control panel, etc.), and wrap a ferrite core (E04SR401938 manufactured by Seiwa Electric Mfg. Co., Ltd.) one turn around the sensor head cable.
- When extending the Sensor Head Cable of the PS-47(C)/49(C)/05/52(C)/55(C)/56/58, cover the entire Sensor Head Cable with conductive piping (for example with metal piping). Also, ground the end part of the piping (the sensor amplifier side).

Remarks: These specifications do not give any guarantee that the end-product with this product incorporated complies with the essential requirements of the EMC Directive. The manufacturer of the end-product is solely responsible for the compliance of the end-product itself according to the EMC Directive.

Included Accessories

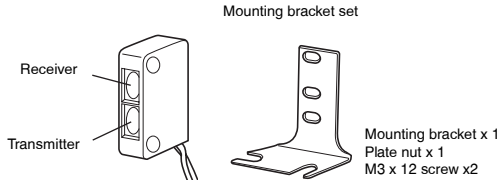
■ Sensor Amplifier

Instruction manual x 1
Sensor head connector x 1

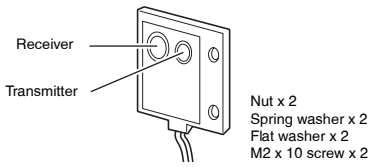


■ Sensor Head

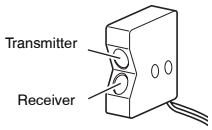
● PS-45



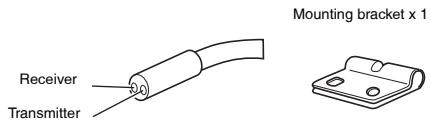
● PS-46



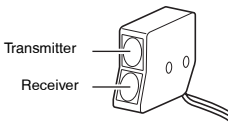
● PS-47/PS-47C*1



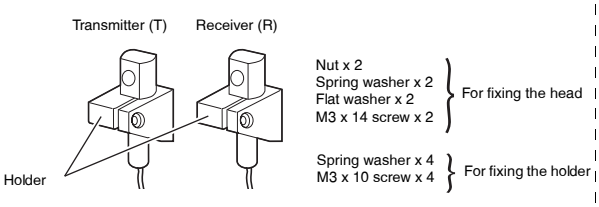
● PS-48



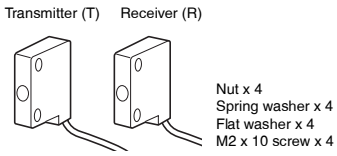
● PS-49/PS-49C*1



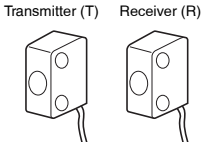
● PS-05



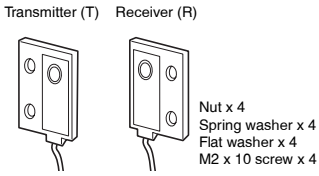
● PS-52/PS-52C*1



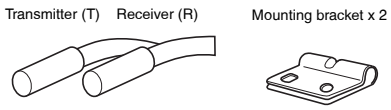
● PS-55/PS-55C*1



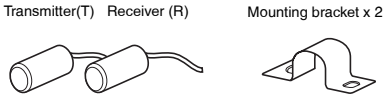
● PS-56



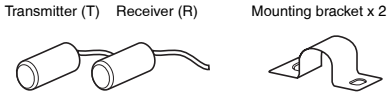
● PS-58



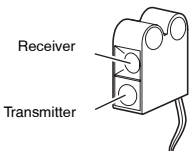
● PS-201/PS-201C*1



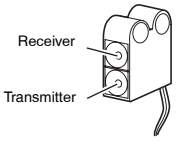
● PS-202



● PS-205



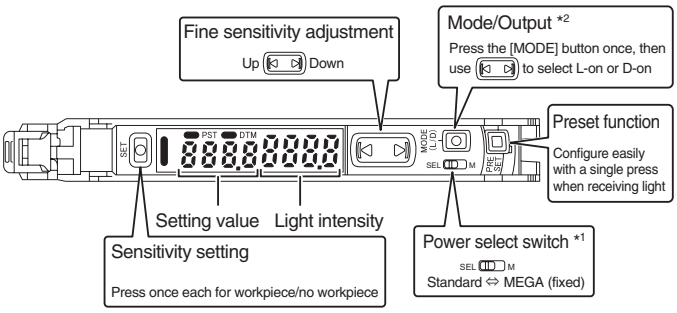
● PS-206



*1 A sensor head connector is attached to the end of the cable for the sensor heads with model names containing the suffix C.

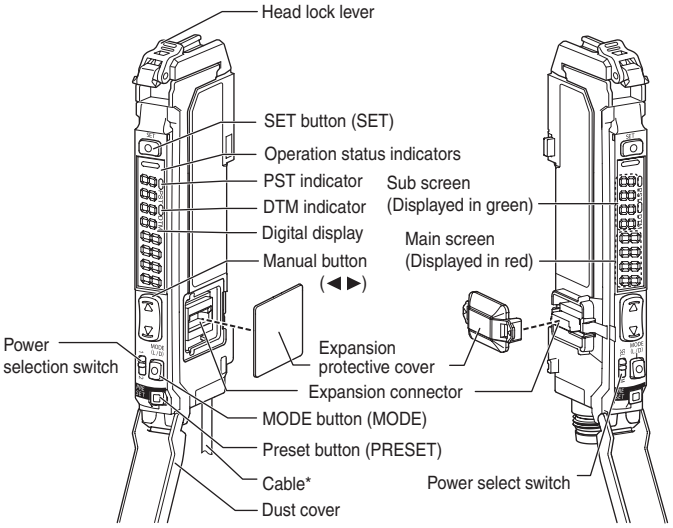
PS-N10 Series Quick Start

■ Quick Start


Fine sensitivity adjustment
Up Down
Mode/Output *2
Press the [MODE] button once, then use to select L-on or D-on
Preset function
Configure easily with a single press when receiving light
Setting value
Light intensity
Sensitivity setting
Press once each for workpiece/no workpiece
Power select switch *1
SEL M
Standard ⇔ MEGA (fixed)

*1 Not available for 0-line types.
*2 Press and hold the [MODE] button to make advanced setting changes.

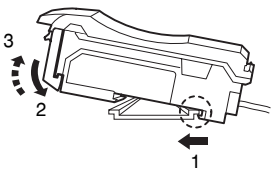
Names of Each Part of the Main Unit and Expansion Unit



* On the PS-N11Cx / N12Cx, this is an M8 connector rather than a cable. Not available for 0-line types.

Mounting Unit

■ Mounting on a DIN Rail

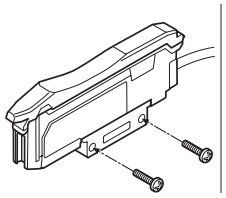


1 **Align the claw at the bottom of the main body with the DIN rail, as shown on the right. While pushing the main body in the direction of the arrow 1, push down in the direction of arrow 2.**

2 **To dismount the sensor, raise the main body in the direction of the arrow 3 while pushing the main body in the direction of arrow 1.**

■ Installation on a Wall (Main Unit Only)

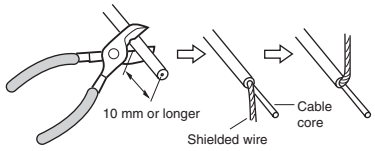
1 **Attach the unit to the optional mounting bracket (OP-73880), and secure with two M3 screws as shown on the right.**



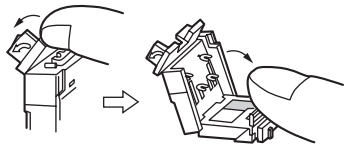
Connecting the Sensor Head to the Sensor Amplifier

■ Installing the Sensor Head Connector

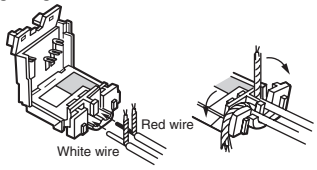
1 **Process the cable ends as shown below. The core wire conductors are stripped so that they are exposed at the time of shipment. Be sure to process the cables without removing the insulation from the cable ends.**



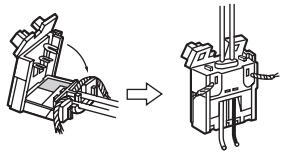
2 **Move the upper left part of the connector in the direction of the arrow and then open the connector.**



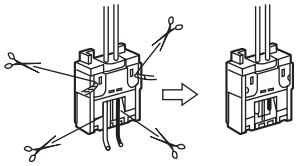
3 **Fully insert the cables with the shielded wires standing upright. Next, bend the shielded wires along the grooves in the direction of the arrow.**



4 **Close the connector to crimp the cables. Return the upper part of the connector to its original position and then lock it.**



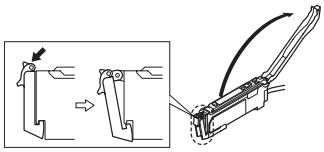
5 **Using nippers, cut off the ends of cables protruding from the connector.**



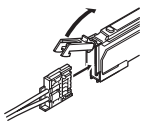
NOTICE	**Crimp the cables no more than three times. Excessively crimping the cables may result in a bad connection.**

■ Connecting the Sensor Head

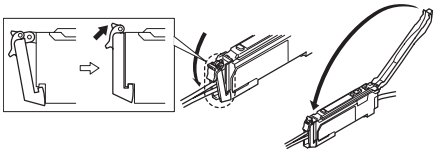
1 **Open the dust cover, and move the head lock lever down.**



2 **Lift the hook up, and insert the connector completely.**



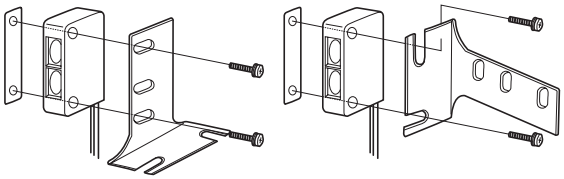
3 **Lower the hook to the position shown in the drawing, and secure the head lock lever by pushing up.**



Mounting the Sensor Head

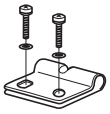
■ PS-45

Use the supplied fixing brackets. There are two ways to mount the sensor head. Make sure the tightening torque does not exceed 0.6 Nm.



■ PS-46/52(C)/56

Use the supplied screws or other similar screws. Make sure the tightening torque does not exceed the following values:
PS-46/56: 0.3 Nm or less
PS-52: 0.15 Nm or less



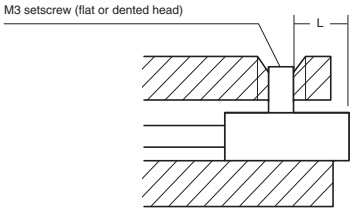
■ PS-47(C)/49(C)/55(C)

Install the M3 screws. Make sure the tightening torque does not exceed 0.6 Nm.

■ PS-48/58

Install the M3 screws when using the supplied fixing brackets.

Make sure to observe the following requirements when using setscrews to mount the sensor head:

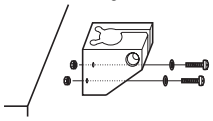


Model	L	Tightening torque
PS-48	5 mm or longer	0.15 Nm or less
PS-58	7 mm or longer	

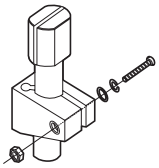
CAUTION	**Note If you place the reflective PS-48 in the mounting hole, it is affected by the light reflected from inside the hole. Place the front side of the PS-48 so that it sticks out of the mounting hole, as shown above.**

■ PS-05

When installing the holder, use the supplied screws and spring washers or other similar parts, as shown on the right. Make sure the tightening torque does not exceed 0.5 Nm.

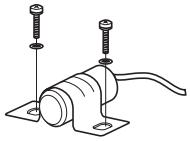


When fixing the PS-05 to the holder, use the supplied screw, nuts, spring washer, and flat washer or other similar parts, as shown on the right. Make sure the tightening torque does not exceed 0.5 Nm.



■ PS-201(C)/202

Use the supplied fixing bracket or similar bracket. Install the M3 screws.



CAUTION	**• Do not use setscrews to install the bracket.** **• Do not bend the 20 mm cable that runs from the end of the sensor head. Maintain a minimum bend radius of 25 mm.**

■ PS-205/206

Install the M4 screws. Make sure the tightening torque does not exceed 0.5 Nm.

CAUTION	**Do not bend the 20 mm cable that runs from the end of the sensor head. Maintain a minimum bend radius of 25 mm.**

Connecting Multiple Amplifiers

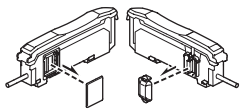
Up to 16 expansion units can be connected to one main unit. Note, however, that the 2 output type is handled as two expansion units.

CAUTION	**Mount on DIN rail and install on metal surface when connecting to multiple amplifiers or mounting main units together.**

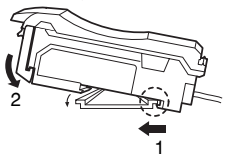
Point

- **Contact your nearest KEYENCE office when connecting units other than the N-bus (name of KEYENCE's wire-saving system) compatible sensor amplifier, including PS-N10 Series, or the NU Series communication module.**
- **Turn the power off before connecting multiple expansion units.**
- **Do not touch the expansion connector with your bare hands.**
- **When using the PS-N10 series as a main unit, verify that expansion products used (other than PS-N10 series expansion units) can operate within the power voltage range of the PS-N10 series.**

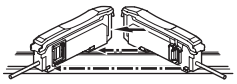
1 **Remove the protection covers from the main unit and expansion unit(s).**



2 **Install the amplifiers on the DIN rail, one at a time.**

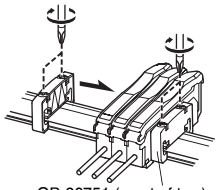


3 **Slide the main unit and expansion unit(s) together. Engage the two claws of the expansion unit with the recesses on the main unit side until you hear/feel a click.**



4 **Attach the end units (option: OP-26751) to the DIN rail in the same way as step (2).**

5 **Secure the amplifiers between the end units. Tighten the screws at the top (two screws per unit) with a Phillips screwdriver to fix the end units.**



OP-26751 (a set of two)

Calibration Method

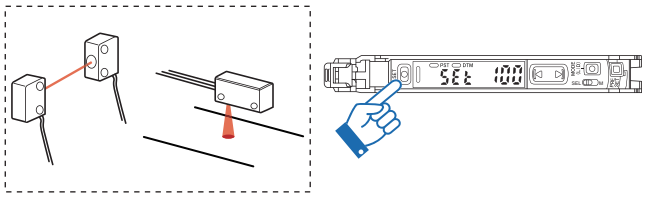
■ To Detect Small Differences

● Two-point Calibration

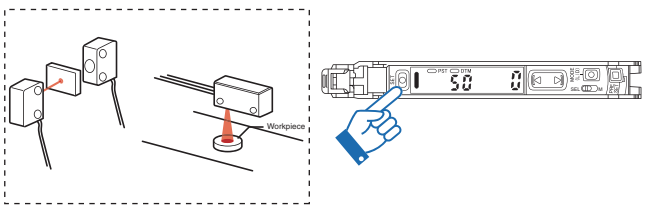
Two-point calibration is the basic method of calibration.
Press the [SET] button once without the workpiece, and then press it once again with the workpiece.

Common to
Thru-Beam Model and **Reflective Model**

1 **Press the [SET] button with no workpiece.**
[SEt] will be displayed on the sub-menu (green display).



2 **Press the [SET] button with a workpiece.**
When complete, the values will be set and the submenu (green display) will flash. The set point will be calibrated to the mid-point between the light intensity when there is no workpiece, and the light intensity when there is a workpiece.



If "----" flashes for two seconds on the main screen, the light intensity is too small between conditions when the workpiece is absent and when it is present. These values will be set, but there is the possibility that detection may become unstable.

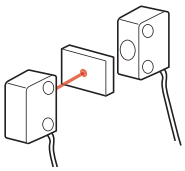
Other Calibration Methods

■ Increased Resistance to Dust and Dirt

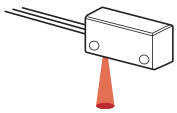
● Maximum Sensitivity Calibration

In the state shown below, press and hold the [SET] button for three seconds or more. Stop pushing when "SEt" flashes. The sensitivity is set slightly higher than the received light intensity.

Thru-Beam Model : with workpiece



Reflective Model : without workpiece

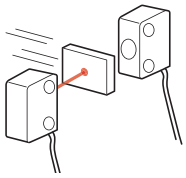


■ Calibrate with a Moving Workpiece

● Full Auto Calibration

Press and hold the [SET] button with no workpiece in place. While "SEt" is flashing, pass a workpiece through. (Continue pressing the [SET] button while the workpiece passes through.)

Common to
Thru-Beam Model and **Reflective Model**

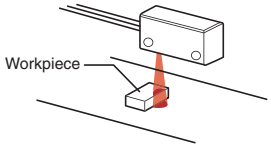


■ Workpiece Positioning

● Positioning Calibration

Press the [SET] button with no workpiece.
Place the workpiece in the location you wish to position it. Press and hold the [SET] button for at least 3 seconds. Release the button when "SEt" flashes.

Common to
Thru-Beam Model and **Reflective Model**



■ Simple Display: Adjusting the Current Value to 100.0

With the PS-N10 Series, the current value can be set to 100.0 through simple key operations. Using a constant current value is useful for predictive maintenance allowing you to find the sensor amplifier for which the received light intensity has decreased.

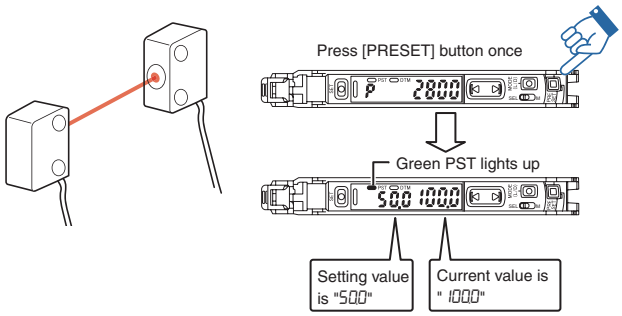
Point

- **Neither preset function below can be used in combination with the zero shift function. Always disable the zero shift function before using the preset function.**
- **The preset function is not suitable for detecting workpieces which have a small received light intensity, such as transparent workpieces, etc.**
- **Refer to the "PS-N10 Series User's Manual" for the operation method of analog output in respect to the preset display.**

Reference Press and hold the [PRESET] button to disable each preset function.

● Preset Function

This function calibrates the current value to " 1000" when the [PRESET] button is pressed in the light-ON state.



Reference

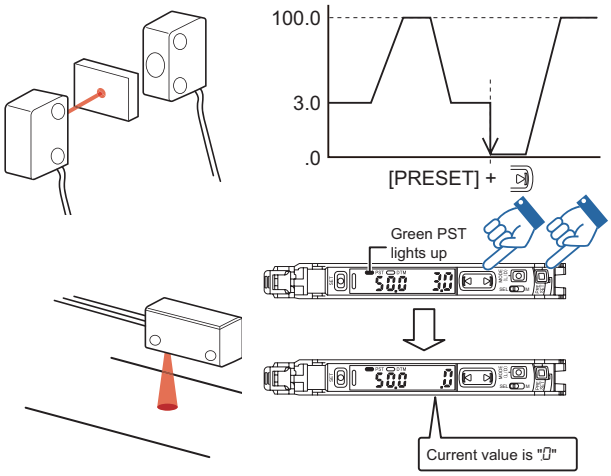
- This function is especially useful when performing simple detection (sensor beam completely interrupted by a non-transparent object) using the thru-beam model / retro-reflective model sensor heads. When using multiple Neo Series units, the display can be easily standardized with this function.

● Target-Preset Function

This function calibrates the current value to "0".
After the preset function has been executed to display " 1000", execute this function to display "0". Two random points can be calibrated to " 1000" and "0".

Important **The target-preset function can be used in combination with the standard preset function (when use of the preset function is valid).**

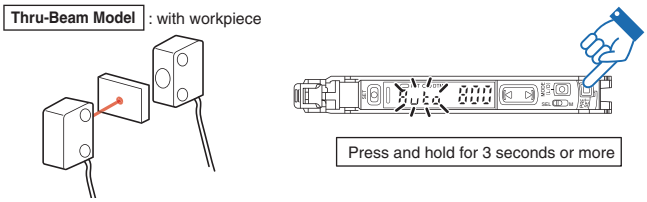
If the ▷| button and [PRESET] button are pressed simultaneously, the current value is set to "0" at that point. The value set to " 1000" with the [PRESET] function does not change.



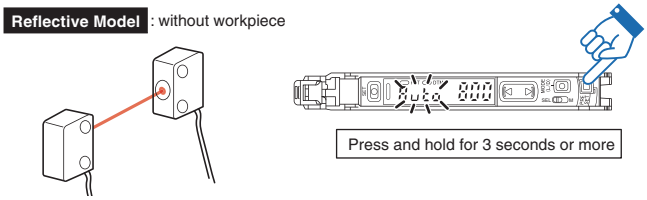
● Maximum Sensitivity Preset Function

This function sets conditions that will serve as reference to "0" and adjusts conditions with slightly higher light intensity to " 1000". This is useful when you would like to perform detection using the background as a reference with reflective models.
Under the following conditions, press and hold the [PRESET] button for 3 seconds or more. Then release your finger when "Auto" flashes.

Thru-Beam Model : with workpiece



Reflective Model : without workpiece



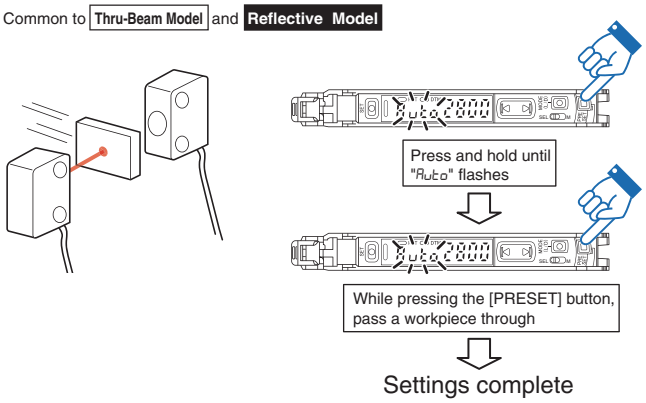
- The maximum value for the light intensity while the [PRESET] button is being pressed is set to "0", and light-intensity that is slightly higher than the maximum value at that time will be adjusted " 1000".
- The setting value is "500"
- The green PST indicator will light up.

Point **Cannot be executed when the Preset function is already being used (when the PST indicator is flashing). Press and hold the [PRESET] button to disable the Preset function before executing this function.**

● Full Auto Preset Function

This function automatically differentiates between two conditions (presence/absence of workpiece) and adjusts the current values to " 1000" and "0". This is effective for cases when the workpiece is moving at high-speed.
Press and hold the [PRESET] button with no workpiece in place. While "Auto" is flashing, pass a workpiece through. (Continue pressing the [PRESET] button while the workpiece passes through.)

Common to **Thru-Beam Model** and **Reflective Model**



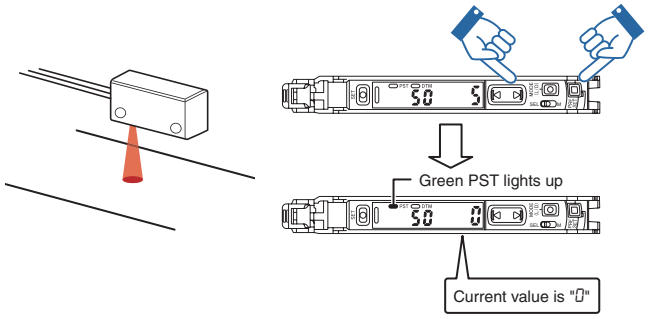
- Near-maximum values while the [PRESET] button is being pressed and held are adjusted to " 1000" and near-minimum values are adjusted to "0" .
- The setting value is changed to "500"
- The green PST indicator will light up.

Point **Cannot be executed when the Preset function is already being used (when the PST indicator is flashing). Press and hold the [PRESET] button to disable the Preset function before executing this function.**

■ Set Current Value to "0"

● Zero Shift Function

This function is primarily used with reflective models.
Press the [PRESET] button and [▷|] button at the same time.



- The current value becomes "0".
- The Green PST lights up.

Point **The zero shift function cannot be used in combination with either preset function. To use the zero shift function, you must first disable the preset function.**

● Disable the Zero Shift Function

Press and hold the [PRESET] button to disable the zero shift function.

Reference

The light intensity may not be set to "0" when the reflective model sensor head is first installed.
In this case, using the zero shift function to set the state with no target present to "0" will make it easier to see the difference in light intensities.

Output Switch

Either light-ON (L-on) mode or dark-ON (D-on) mode can be selected.

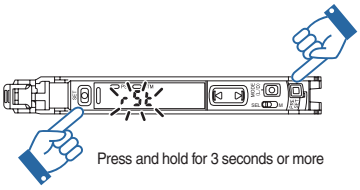
1 While the current value is displayed, press the [MODE] button once.

2 Use [◁] to switch the output (L-on/d-on), then press the [MODE] button again. The output change completes, and the display returns to the current value.

Initializing the Settings

■ Initialization Method

1 Press and hold the [SET] and [PRESET] buttons simultaneously for more than three seconds.



2 Use the [◁] to select "rSt", then press the [MODE] button.

3 Use the [◁] to select "in it", then press the [MODE] button.
After initialization is complete, the display returns to the current value.

● Initial Settings

Setting	Initial value
Power mode	TURBO
Detection mode	Std (Normal)
Setting value	50
Output switch	L-on

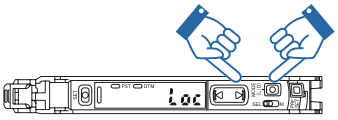
Key Lock

The key lock function disables button operation to prevent unauthorized use.

■ Activating Key Lock

1 Press and hold the [MODE] button and [◁] (or [▷]) simultaneously for three seconds or more.

2 The screen displays "Loc", disabling key operation.



■ Deactivating Key Lock

1 Press and hold the [MODE] button and [◁] (or [▷]) simultaneously for three seconds or more.

2 The screen displays "unL", enabling key operation.

Error Displays and Corrective Actions

Error display	Cause	Solution
ErC	Overcurrent in the control output.	• Check the load and return the current within the rated range. • Check that the output wire is not contacting any other wire or frame.
ErH	Sensor head cable is broken or is not connected.	• Check that the sensor head is connected. • Check sensor head cable for damage. • Check the sensor head cable connector for damage or loose connections. After checking, turn the power OFF and ON.
ErE	Internal data write / load failed.	Turn the power OFF and ON. If the data is not recovered, initialize the settings.
Loc	Key lock function is enabled, or the power mode was fixed to MEGA mode using the selector switch.	• Release the key lock. • Check that the sensor amplifier selector switch is set to MEGA mode.
The DTM indicator flashes.	Correction error in DATUM1 or DATUM 2 mode.	See "PS-N10 Series User's Manual" for details.

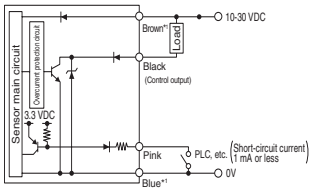
For errors other than the above, contact your nearest KEYENCE office.

Connecting to External Devices

■ Cable Type

PS-N11N / N12N

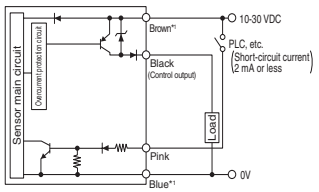
Input / output circuit diagram



*1 PS-N11N only

PS-N11P / N12P

Input / output circuit diagram

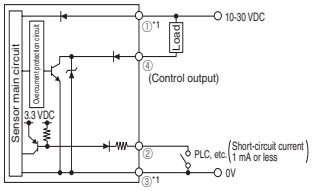


*1 PS-N11P only

■ M8 Connector Type

PS-N11CN / N12CN

Input / output circuit diagram

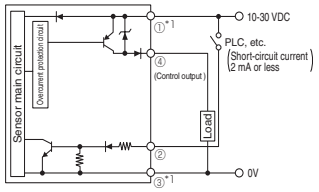


*1 PS-N11CN only

M8 connector pin layout

PS-N11CP / N12CP

Input / output circuit diagram



*1 PS-N11CP only

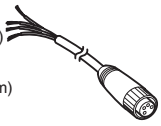
M8 connector pin layout

■ Socket Cable (Sold Separately)

For PS-N11Cx / N12Cx

OP-73864
(Cable length: 2 m)

OP-73865
(Cable length: 10 m)



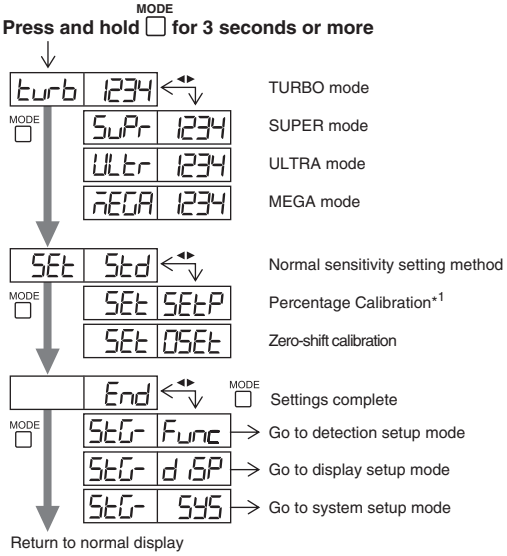
Pin and wire color table

Connected pin No.	Wire color
1	Brown
2	White
3	Blue
4	Black

Function Configuration

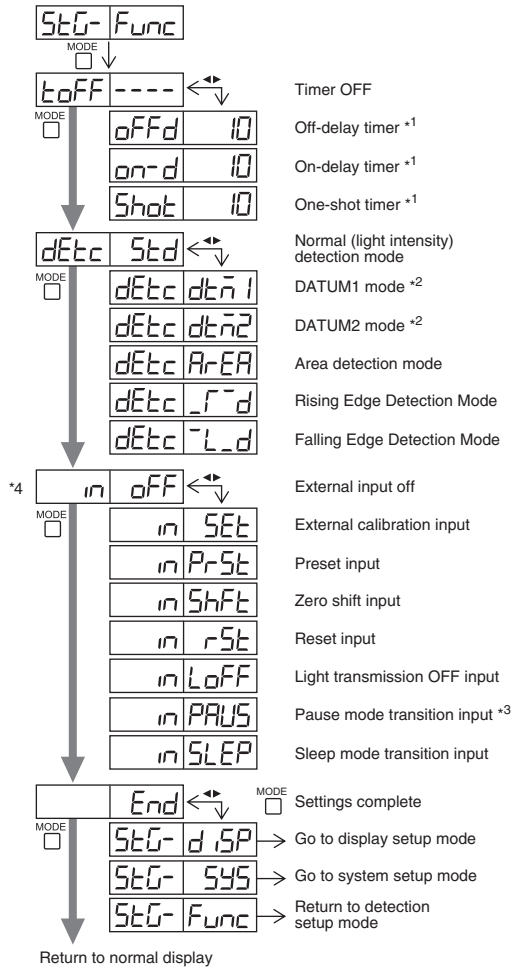
See "PS-N10 Series User's Manual" for details on each function.

■ Basic Setting



*1 You can press the MODE button to set between the range of -99P and 99P.

■ Detection Settings (Func)



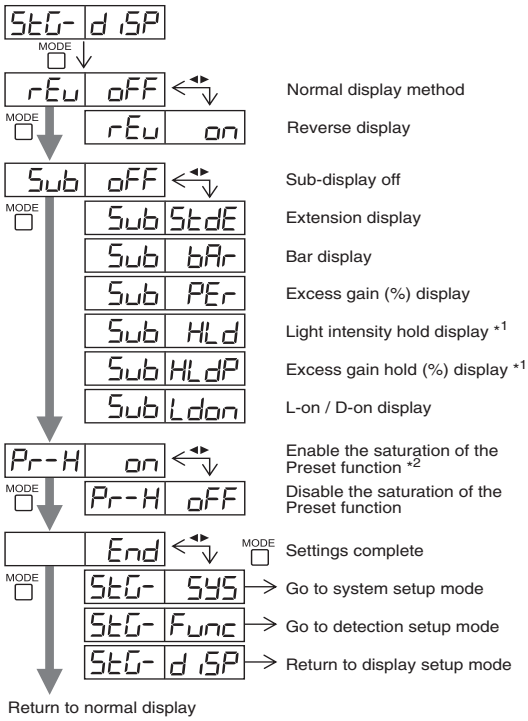
*1 Press the MODE button to set between the range of 1 and 9999(ms).

*2 Press the MODE button to set the adjustment sensitivity to a range of between LEv1 and LEv3 and set the warning output level to a range of between 0P and 100P.

*3 Press the MODE button to toggle between oFF/on/KEEP.

*4 This display does not appear on the cable-type expansion unit (PS-N12N/N12P).

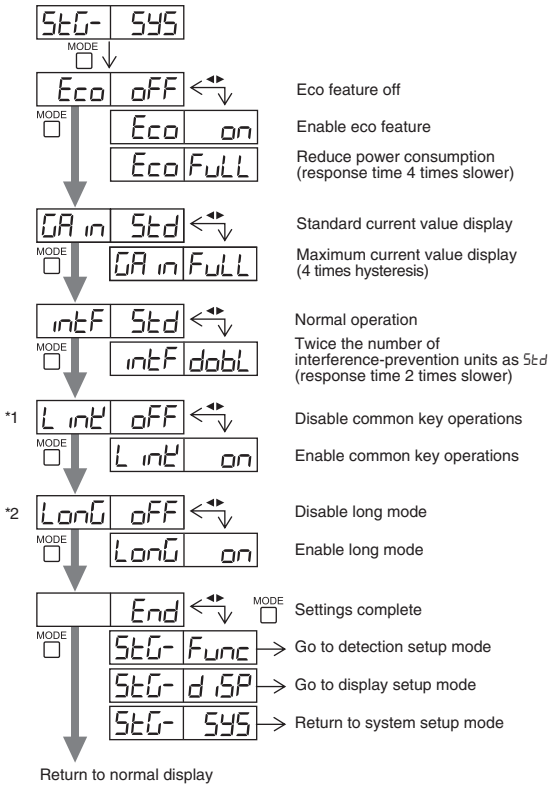
■ Display Settings (diSP)



*1 Press the MODE button to toggle between Std/P-P_/b-b_/P_b-/P-b_.

*2 Press the MODE button to set between the range of 100P and 200P.

■ System Settings (SYS)



*1 Main unit only.

*2 The PS-47(C), PS-48, PS-49(C), PS-58 and PS-206 do not support long-distance detection mode. Do not select long-distance detection mode when using these sensor heads.

Reference

- Press the MODE button and the button simultaneously to return to the previous setting.
- When the MODE button is held down, the settings will end.

Specifications

■ Transparent Sensor Heads

Type		Thru-beam type						
		General-purpose					Environmentally resistant type	
		Long distance	Adjustable axis	Cylinder	Flat		Long distance	Built-in groove
Model *1		PS-55(C)	PS-05	PS-58	PS-52(C)	PS-56	PS-201(C)	PS-202
Detection distance*2 (mm)	MEGA	3600 (6000)	3600 (6000)	1000	1200 (1500)	750 (900)	3600 (6000)	900 (1000)
	ULTRA	2800 (5000)	2800 (5000)	900	800 (1000)	500 (600)	2800 (5000)	700 (900)
	SUPER	2200 (4200)	2200 (4200)	750	400 (650)	400 (450)	2200 (4200)	600 (800)
	TURBO	2000 (4000)	2000 (4000)	700	300 (600)	300 (400)	2000 (4000)	500 (750)
Smallest detectable object*3		Φ 1 mm opaque		Φ 0.5 mm opaque	Φ 0.3 mm opaque	Φ 0.3 mm opaque	Φ 0.8 mm opaque	Φ 0.5 mm opaque
Light source		Infrared LED						
LED Class		Class 1 LED Product (IEC60825-1)						
Environmental resistance	Protection structure	IP64		IP67	-		IP67	
	Operating ambient temperature	-10ºC to +60ºC (no freezing)						
	Operating ambient luminance	Incandescent lamp: 4,000 lx or less; sunlight: 12,000 lx or less						
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours for each axis (X, Y, and Z)						
Weight (2 m cable included)		Approx. 30 g	Approx. 30 g	Approx. 30 g	Approx. 30 g	Approx. 30 g	Approx. 40 g	Approx. 40 g

*1 A sensor head connector is attached to the end of the cable for the sensor heads with model names containing the suffix C.
*2 The values in parentheses indicate the detection distance when long-distance detection mode is enabled and a 5 m sensor head cable is used.
*3 The size of a workpiece that can be detected at the maximum detection distance.

■ Reflective Sensor Heads

Type		Diffuse reflective type					Limited reflective type	
		General-purpose			Environmentally resistant		General-purpose	
		Long distance	Flat	Cylinder	Long distance	Narrow vision	Small spot	Long distance
Model *1		PS-45	PS-46	PS-48	PS-205	PS-206	PS-47(C)	PS-49(C)
Detection distance *2 (mm)	MEGA	600 (900)	200 (250)	75	600 (900)	250	10±4	32 to 53
	ULTRA	400 (600)	150 (200)	45	400 (600)	180		
	SUPER	250 (450)	120 (160)	30	250 (450)	100		
	TURBO	200 (400)	100 (140)	25	200 (400)	70		
Smallest detectable object *3		-	-	-	-	-	Φ 0.03 mm copper wire	Φ 0.1 mm copper wire
Spot diameter		-	-	-	-	Φ 6 mm when the detection distance is 70 mm	Φ 8 mm when the detection distance is 10 mm	Φ 1.5 mm when the detection distance is 50 mm
Light source		Infrared LED				Red LED		
LED Class		Class 1 LED Product (IEC60825-1)						
Environmental resistance	Protection structure	IP64	-	IP67			-	
	Operating ambient temperature	-10ºC to +60ºC (no freezing)						-10ºC to +50ºC (no freezing)
	Operating ambient luminance	Incandescent lamp: 4,000 lx or less; sunlight: 12,000 lx or less					Incandescent lamp: 4,000 lx or less; sunlight: 5,000 lx or less	
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours for each axis (X, Y, and Z)						
Weight (2 m cable included)		Approx. 30 g	Approx. 30 g	Approx. 40 g	Approx. 60 g	Approx. 60 g	Approx. 30 g	Approx. 30 g

*1 There is a sensor head connector attached to the end of the cable for the sensor heads with model names containing the suffix C.
*2 The values in parentheses indicate the detection distance when long-distance detection mode is enabled.
*3 The values obtained by optimizing the detection distance and sensitivity.

■ Sensor Amplifier

Cable / Connector		Cable		M8 Connector		0-line
Main unit / Expansion unit		Main unit	Expansion unit	Main unit	Expansion unit	Expansion unit
Model	NPN	PS-N11N	PS-N12N	PS-N11CN	PS-N12CN	PS-N10
	PNP	PS-N11P	PS-N12P	PS-N11CP	PS-N12CP	
Control output		1 output	1 output	1 output	1 output	N/A *1
External input		1 input	N/A	1 input	1 input	N/A
Response time		500 µs (TURBO)/1 ms (SUPER)/4 ms (ULTRA)/16 ms (MEGA)				
Output operation		Light-ON/Dark-ON				
Timer function		Timer OFF, OFF delay, ON delay, One-shot Timer variable (1 ms to 9999 ms) Maximum error to setting value is ±10 % or less				
Control output	NPN output	NPN open collector 30 V, Max: 100 mA or less (for standalone operation)/20 mA or less (for expansion) Residual voltage 1 V or less (Output current: 10 mA or less)/2 V or less (Output current: 10 to 100 mA)				
	PNP output	PNP open collector 30 V, Max: 100 mA or less (standalone operation)/20 mA or less (for expansion) Residual voltage 1.2 V or less (Output current: 10 mA or less)/2.2 V or less (Output current: 10 to 100 mA)				
External input		No-voltage input (with/without contact), Input time 2 ms (ON)/20 ms (OFF) or more *2				
Expansion units		Up to 16 units (a total of 17 units connected)				
Protection circuit		Protection against reverse power connection, output overcurrent, output surge, and output wiring error				
Number of interference prevention units		TURBO/SUPER/ULTRA/MEGA: 4 (These numbers double when "Double" is selected.)				
Rated	Power voltage *4	24 VDC (operating voltage 10-30 VDC (including ripple)), ripple (P-P) 10 % or less, Class 2 or LPS				
	NPN *5	Normal: 810 mW or less (28 mA or less at 24 and 30 V, 34 mA or less at 12 V) Eco on: 700 mW or less (24 mA or less at 24 and 30 V, 27 mA or less at 12 V) Eco full: 490 mW or less (17 mA or less at 24 and 30 V, 20 mA or less at 12 V)				
	PNP *5	Normal: 860 mW or less (30 mA or less at 24 and 30 V, 35 mA or less at 12 V) Eco on: 750 mW or less (26 mA or less at 24 and 30 V, 28 mA or less at 12 V) Eco full: 540 mW or less (19 mA or less at 24 and 30 V, 21 mA or less at 12 V)				
Environmental resistance	Operating ambient temperature	- 20 ºC to + 55 ºC (no freezing) *3				
	Operating ambient humidity	35 to 85 % RH (no condensation)				
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours for each of X, Y, Z axes				
	Shock resistance	500 m/s^2, 3 times for each of X, Y, Z axes				
Material	Housing	Amplifier body and dust cover material: Polycarbonate				
	Cable	PVC				
Housing dimensions		H 32.6 mm x W 9.8 mm x L 78.7 mm				
Weight		Approx. 75 g	Approx. 65 g	Approx. 20 g	Approx. 20 g	Approx. 20 g

*1 Counted as one output when units are added to NU series communication units.
*2 Input time is 25 ms (ON)/25 ms (OFF) only when an external tuning input is selected.
*3 The operating ambient temperature varies as shown below when units are added. For expansion, be sure to mount the units on the DIN rail (metallic plate) and prevent the output current for each unit from exceeding 20 mA.
- 20ºC to + 55ºC for 1 or 2 units added, - 20ºC to + 50ºC for 3 to 10 units added, - 20ºC to + 45ºC for 11 to 16 units added
*4 When connecting nine or more expansion units, ensure that the power voltage is 20 V or more.
*5 The maximum power consumption including load is 29.3 W.
*6 Use with the over current protection device which is rated 30 V or more and not more than 1 A.

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